

WHAT IS CLAIMED IS:

1. An exhaust processing method of exhausting a processing space for subjecting a substrate or a film to plasma processing, which comprises providing  
5 chemical-reaction inducing means in an exhaust line connecting the processing space to exhaust means, and causing chemical reaction of at least either an unreacted gas or a byproduct exhausted from the processing space to chemically react without allowing  
10 plasma in the processing space to reach the chemical-reaction inducing means.

2. The exhaust processing method according to claim 1, wherein the chemical reaction of at least  
15 either the unreacted gas or the byproduct exhausted from the processing space is caused by heating of the chemical-reaction inducing means.

3. The exhaust processing method according to claim 2, wherein a metal member of a high melting point  
20 is used as the chemical-reaction inducing means.

4. The exhaust processing method according to claim 3, wherein at least one of chromium, molybdenum,  
25 tungsten, vanadium, niobium, tantalum, titanium, zirconium, and hafnium is used for the metal member of a high melting point.

5. The exhaust processing method according to claim 1, wherein means for blocking plasma is provided between the processing space and the chemical-reaction inducing means.

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6. The exhaust processing method according to claim 5, wherein a conductive member is provided as the means for blocking plasma and has a potential different from that in a plasma space.

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7. The exhaust processing method according to claim 6, wherein a metal member is used as the conductive member.

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8. The exhaust processing method according to claim 6, wherein a material used for the chemical-reaction inducing means is similarly used for the conductive member.

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9. The exhaust processing method according to claim 5, wherein an electrically grounded member is used as the means for blocking plasma.

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10. The exhaust processing method according to claim 5, wherein one or more linear members or spirally-wound linear members are used as the means for blocking plasma.

11. The exhaust processing method according to claim 5, wherein a mesh is used as the means for blocking plasma.

5           12. The exhaust processing method according to claim 5, wherein a plate-like member having a shape for preventing passage of the plasma is used as the means for blocking plasma.

10           13. The exhaust processing method according to claim 5, wherein a plate-like member with openings is used as the means for blocking plasma.

15           14. The exhaust processing method according to claim 5, wherein a plate-like member is used as the means for blocking plasma and the plate-like member is arranged in the exhaust line so that a gap is provided between the plate-like member and an inner wall of the exhaust line.

20           15. A plasma processing method for subjecting a substrate or a film to plasma processing, which comprises arranging a chemical-reaction inducing means in an exhaust line connecting a processing space for  
25 plasma processing to exhaust means for exhausting the processing space, and causing chemical reaction of at least either an unreacted gas or byproduct exhausted

from the processing space without allowing plasma in the processing space to reach the chemical-reaction inducing means.

5           16. The plasma processing method according to claim 15, wherein the chemical reaction of at least either the unreacted gas or byproduct exhausted from the processing space is caused by heating of the chemical-reaction inducing means.

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          17. The plasma processing method according to claim 16, wherein a metal member of a high melting point is used as the chemical-reaction inducing means.

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          18. The plasma processing method according to claim 17, wherein at least one of chromium, molybdenum, tungsten, vanadium, niobium, tantalum, titanium, zirconium, and hafnium is used for the metal member of a high melting point.

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          19. The plasma processing method according to claim 15, wherein means for blocking plasma is provided between the processing space and the chemical-reaction inducing means.

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          20. The plasma processing method according to claim 19, wherein a conductive member is provided as

the means for blocking plasma and has a potential different from that in a plasma space.

21. The plasma processing method according to  
5 claim 20, wherein a metal member is used as the  
conductive member.

22. The plasma processing method according to  
10 claim 20, wherein a material used for the chemical-  
reaction inducing means is similarly used for the  
conductive member.

23. The plasma processing method according to  
15 claim 19, wherein the means for blocking plasma  
comprises an electrically grounded member.

24. The plasma processing method according to  
20 claim 19, wherein one or more linear members or  
spirally-wound linear members are used as the means for  
blocking plasma.

25. The plasma processing method according to  
claim 19, wherein a mesh means for blocking plasma.

26. The plasma processing method according to  
25 claim 19, wherein a plate-like member having a shape  
for preventing passage of the plasma is used as the

means for blocking plasma.

27. The plasma processing method according to  
claim 19, wherein a plate-like member with openings is  
5 used as the means for blocking plasma.

28. The plasma processing method according to  
claim 19, wherein a plate-like member is used as the  
means for blocking plasma, and the plate-like member is  
10 arranged in the exhaust line so that a gap is provided  
between the plate-like member and an inner wall of the  
exhaust line.

29. The plasma processing method according to  
15 claim 15, wherein the plasma processing is film  
formation conducted by a plasma CVD process.

30. The plasma processing method according to  
claim 15, wherein the plasma processing is plasma  
20 etching a substrate or a film.

31. A plasma processing apparatus comprising a  
processing space for subjecting a substrate or a film  
to plasma processing, exhaust means for exhausting the  
25 processing space, and an exhaust line connecting the  
processing space to the exhaust means,

wherein chemical-reaction inducing means is

provided in the exhaust line, and means for blocking plasma is arranged between the processing space and the chemical-reaction inducing means.

5           32. The plasma processing apparatus according to claim 31, wherein the chemical-reaction inducing means a heating element.

10           33. The plasma processing apparatus according to claim 31, wherein the chemical-reaction inducing means a metal member of a high melting point.

15           34. The plasma processing apparatus according to claim 33, wherein the metal member of a high melting point contains at least one selected from the group consisting of chromium, molybdenum, tungsten, vanadium, niobium, tantalum, titanium, zirconium, and hafnium.

20           35. The plasma processing apparatus according to claim 31, wherein a conductive member is provided as the means for blocking plasma and has a potential different from that in a plasma space.

25           36. The plasma processing apparatus according to claim 35, wherein the conductive member is composed of a metal.

37. The plasma processing apparatus according to claim 35, wherein the conductive member comprises the same material as that of the chemical-reaction inducing means.

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38. The plasma processing apparatus according to claim 35, wherein the means for blocking plasma an electrically grounded member.

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39. The plasma processing apparatus according to claim 31, wherein the means for blocking plasma one or more linear members or spirally-wound linear members.

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40. The plasma processing apparatus according to claim 31, wherein the means for blocking plasma a mesh.

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41. The plasma processing apparatus according to claim 31, wherein the means for blocking plasma a plate-like member having a shape for preventing passage of the plasma.

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42. The plasma processing apparatus according to claim 31, wherein the means for blocking plasma a plate-like member with openings.

43. The plasma processing apparatus according to claim 31, wherein the means for blocking plasma a



plate-like member arranged in the exhaust line so that a gap is provided between the plate-like member and an inner wall of the exhaust line.

5           44. The plasma processing apparatus according to claim 31, wherein the plasma processing is film formation utilizing a plasma CVD process.

10           45. The plasma processing apparatus according to claim 31, wherein the plasma processing is plasma etching of a substrate or a film.

15           46. A plasma processing apparatus comprising a processing space for subjecting a substrate or a film to plasma processing, exhaust means for exhausting the processing space, and an exhaust line connecting the processing space to the exhaust means,

20           wherein a first metal member connected to a power source is provided in the exhaust line, and a second metal member electrically grounded is provided between said processing space and the first metal member.

25           47. The plasma processing apparatus according to claim 46, wherein the first and second metal members comprise the same raw material.

48. The plasma processing apparatus according to

claim 46, wherein the first and second metal members  
have the same shape.

49. The plasma processing apparatus according to  
5 claim 46, wherein the first and second metal members  
each comprise a filament.

50. The plasma processing apparatus according to  
10 claim 46, wherein the first metal member is heated by  
means of power supplied by the power source.